

practice the invention. None of the illustrations in that section refer to the product of a chemical process or reaction and, indeed, Applicants submit that the identity of the product is not an essential step in practicing the invention.

This invention involves the oxidation of methanol and/or ethanol using a platinum group metal oxide catalyst. As discussed in the specification, the oxidation products may vary, depending on the conditions chosen. Methanol is oxidized to products that may contain one or more of methyl formate, dimethoxymethane and formaldehyde. Ethanol is oxidized primarily to diethoxyethane but other products may also be formed. The various types of preferred products are claimed in several dependent claims.

Applicants request withdrawal of the rejection of claims under Section 112.

Claims 1, 2, 6, 8, 11, 12 and 23 stand rejected as obvious over Yamaguchi et al.

Yamaguchi et al. is characterized as teaching a reaction of a general type of alcohol with oxygen in the presence of a ruthenium-on-alumina catalyst. The examiner notes that the reference does not disclose oxidation of methanol or ethanol but believes that this would be obvious.

Applicants first note that the reference is directed primarily to the oxidation of benzyl alcohols. It does contain the general alcohol formula mentioned in the Office Action, and the table includes sec-pentanol, which is the only aliphatic alcohol mentioned.

Applicants note that methanol and ethanol are shorter-chain primary alcohols as opposed to sec-pentanol, which is a longer chain alcohol and, in addition, a secondary alcohol. Applicants submit that, contrary to the examiner's assertion, a process in which a longer chain secondary alcohol is oxidized does not make obvious the oxidation of a much shorter chain primary alcohol.

Secondly, Applicants note that the claimed invention herein is the oxidation of methanol and/or ethanol using a supported platinum group metal oxide.

However, Yamaguchi et al. used supported metallic catalysts, not oxides, and indeed, contains a statement that ruthenium oxide showed no catalytic activity (p. 4539, bottom of left-hand column). Applicants' process is therefore not obvious from Yamaguchi et al.

Claim 7 stands rejected as obvious over the combination of Yamaguchi et al. with Tanaka et al., the later being cited for the proposition that diethoxyethane is a primary product of ethanol oxidation using supported catalysts. However (a) this reference contains no such general statement but is limited to oxidation of ethanol using silica-supported niobium oxide catalysts, and (b) Yamaguchi et al. disclose only metallic catalysts, not metal oxides, as stated above.

Tanaka et al. do not make up for the deficiency of Yamaguchi et al., and consequently the claimed process is not obvious over this combination of references.

Claims 1-6, 9-13, 16-20 and 24-28 stand rejected over the combination of JP 65123 (Mitsui Toatsu) with Mallat et al.

A complete translation of JP 65123 is provided in the accompanying Information Disclosure Statement. It shows not only that the reference does not disclose supported metal oxide catalysts, but that the reference does not disclose platinum group metal oxide catalysts.

As stated in the abstract, JP65123 discloses use of combinations of two metals or metal compounds as catalysts. As suitable metals for the catalysts, the reference lists metals from ten groups of the Periodic Table (translation, page 4), and names a total of thirty suitable metals, including all six members of the platinum group - though these are segregated among three different groups. The same paragraph states that if metal compounds are used rather than the metals themselves, the compounds should be halides, nitrates, sulfates, oxides, hydroxides, phosphates, ammonium salts, acetylacetates, carbonyl compounds, alkyl complexes, amine complexes, aryl complexes and/or phosphine complexes. In other words, the reference lists a huge number of possible metals and metallic compounds that may be used. It does not focus either on platinum group metals or on oxides in general. In addition, it calls for a combination of two such

metals and/or compounds. The only examples use a combination of metallic rhodium and iridium.

This reference in no way discloses the use of platinum group metal oxides for oxidation of methanol and/or ethanol. Mallat et al. disclose only the use of metallic catalysts.

Accordingly, the claims herein are not rendered obvious over the combination of J123 and Mallat et al.

Claims 14 and 15 are rejected as obvious over the combination of JP123 and Mallat et al., plus Kirk-Othmer. However, the latter reference does not make up for the lack of disclosure of platinum group metal oxide catalysts in the other two references. Claims 14 and 15 are not obvious over this combination of references.

CONCLUSION

In view of the foregoing, Applicants submit that the claims are allowable over the cited art, and respectfully request issuance of a Notice of Allowance.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned.

Respectfully submitted,

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